

A Next Generation Spacecraft Heat Rejection System, Phase I

Completed Technology Project (2018 - 2019)



Project Introduction

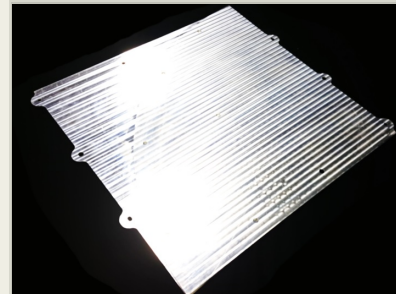
In response to NASA SBIR FY 2018 In response to NASA SBIR FY 2018 topic Z2.01, Thermal Management, ThermAvant Technologies, LLC proposes to develop an innovative, passive heat transfer device that can significantly improve the spacecraft's thermal control system, namely around heat acquisition and rejection capabilities. ThermAvant proposes to develop an advanced Oscillating Heat Pipe (OHP) based heat rejection system that will enable next generation communications and power electronics to be easily integrated into space vehicle systems. ThermAvant's research team will demonstrate the proposed concepts and innovations through design, manufacturing and laboratory testing.

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Anticipated Benefits

The NASA Technology Roadmap identifies the need for Phase Change Material Storage, under Heat Rejection and Energy Storage. Two specific programs that could benefit from the technology are the DRM 5 Asteroid Redirect and the New Frontiers Program 4, both of which need an enabling energy storage system during portions of missions with cyclic thermal environments. All future NASA missions will likely require the highest efficiency radiators, as the backbone of their thermal control system.

Large-format, high capacity radiators will have applications in terrestrial vehicles with electrical loads, and in large industrial vehicles where the proposed passive solution may be able replace actively pumped single-phase radiators with air cooled systems. These panels may be a viable solution for acquiring heat and rejecting to the heat sink (air, space, water, etc.).



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Table of Contents

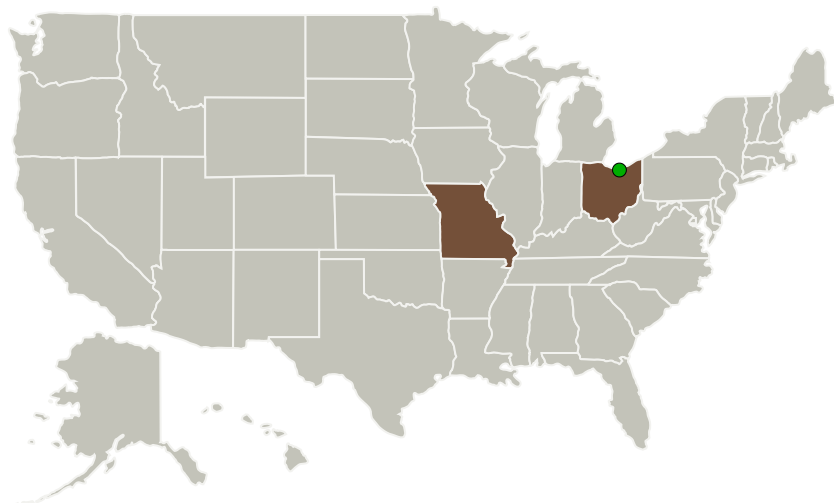
Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	2
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Images	3
Technology Areas	3
Target Destinations	3

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
ThermAvant Technologies, LLC	Lead Organization	Industry	Columbia, Missouri
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

Missouri	Ohio
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Project Transitions

▶ **July 2018:** Project Start

✓ **February 2019:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140887>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ThermAvant Technologies, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

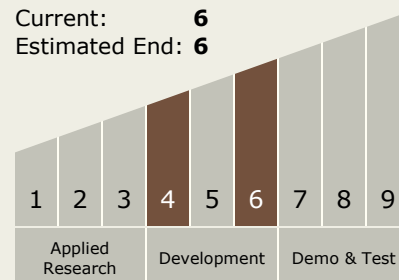
Carlos Torrez

Principal Investigator:

Daniel Pounds

Technology Maturity (TRL)

Start: 4
Current: 6
Estimated End: 6

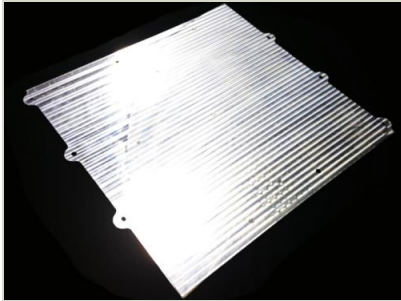


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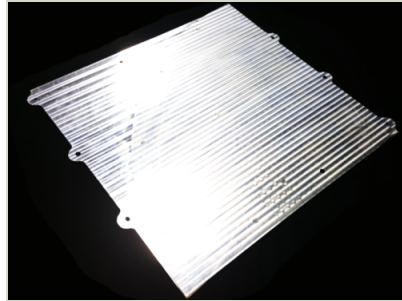


Images



Briefing Chart Image

A Next Generation Spacecraft Heat Rejection System, Phase I
(<https://techport.nasa.gov/image/137273>)



Final Summary Chart Image

A Next Generation Spacecraft Heat Rejection System, Phase I
(<https://techport.nasa.gov/image/133866>)

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.2 Thermal Control Components and Systems
 - └ TX14.2.3 Heat Rejection and Storage

Target Destinations

Others Inside the Solar System, Foundational Knowledge